FP043-15 Introduction to Interdisciplinary Mathematics

22/23

Department
Warwick Foundation Studies
Level
Foundation
Credit value
15
Module duration
10 weeks
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

FP043-15 Introduction to Interdisciplinary Mathematics

[Module web page](#)

Module aims

Recognise and appreciate the scope of the application of mathematics to find solutions to real-world problems in a range of disciplines.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

A selection of topics from the following disciplines:

Life Sciences
e.g. Population growth

- Using differential equations to describe population growth

e.g. Spread of disease

- Using differential equations to describe the spread of disease

e.g. Forensic Science

- Using Newton's Law of Cooling

Physics
e.g. Classical Mechanics

- Kinematics
- Dynamics
- Statics

e.g. Astronomy

- Using Kepler's laws of planetary motion

Business
e.g Linear Programming

- Formulation of problems as linear programs
- Graphical solutions of two variable problems
- The Simplex algorithm and tableau for optimising problems

Economics
e.g. Game Theory

- Introduction to two-person games and the pay-off matrix
- Determining play-safe strategies and stable solutions

e.g. Supply and Demand

- Determining supply and demand equations
- Understanding supply and demand curves
- Calculating equilibrium points

e.g. Price Elasticity

- Introduction to the elasticity of a function
- Understanding and calculating the price elasticity of supply
- Understanding and calculating the price elasticity of demand

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate an understanding of, and the ability to describe, real-world scenarios using mathematics
- Carry out investigations and analysis which will help to form conclusions and/or aid the

decision making processes in a variety of contexts
- Critically analyse results, whilst appreciating the limitations of the mathematics used and any assumptions made
- Demonstrate the problem-solving skills required to become an independent undergraduate learner on relevant mathematically related degree programmes

Indicative reading list

General
Saaty, T.L. and Alexander, J.M., 1981. Thinking with models: mathematical models in the physical, biological, and social sciences. RWS Publications.

Humi, M., 2017. Introduction to Mathematical Modeling. Chapman and Hall/CRC.

Life Sciences
Adam, C., 2011. Essential mathematics and statistics for forensic science. John Wiley & Sons.

Katz, E. and Halámek, J. eds., 2016. Forensic science: A multidisciplinary approach. John Wiley & Sons.

Segel, L.A. and Edelstein-Keshet, L., 2013. A Primer in Mathematical Models in Biology (Vol. 129). Siam.

Vynnycky, E. and White, R., 2010. An introduction to infectious disease modelling. Oxford University Press.

Physics
Fitzpatrick, R., 2012. An introduction to celestial mechanics. Cambridge University Press.

Fleisch, D. and Kregenow, J., 2013. A Student's Guide to the Mathematics of Astronomy. Cambridge University Press.

Morin, D., 2008. Introduction to classical mechanics: with problems and solutions. Cambridge University Press.

Business
Towler, M. and Keast, S., 2009. Rational decision making for managers: An introduction. Wiley.

Economics
Carmichael, F., 2005. A guide to game theory. Pearson Education.

Dowling, E.T., 2001. Schaum's outline of theory and problems of introduction to mathematical economics.

Perloff, J.M., 2014. Microeconomics with calculus.

[View reading list on Talis Aspire](#)

Interdisciplinary

The module is interdisciplinary in nature, allowing cross over with many disciplines, including Life

Sciences, Physical Sciences, Business and, Economics.

Subject specific skills

Mathematical Skills

Analytical Skills

Problem-solving skills

Transferable skills

Mathematical Skills

Analytical Skills

Problem-solving skills

Communication Skills

Study

Study time

Type	Required
Seminars	48 sessions of 1 hour (34%)
Private study	90 hours (63%)
Assessment	5 hours (3%)
Total	143 hours

Private study description

Private Study.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A2

	Weighting	**Study time**
Final examination	60%	
Written Report (1500 words)	40%	5 hours

Feedback on assessment

Written feedback provided on scripts and Tabula.

Availability

Courses

This module is Core for:

- Year 1 of FIOE Warwick International Foundation Programme